September 29, 2005

(AR-18J)

John Rogner
Field Supervisor
United States Fish and Wildlife Service
Chicago Ecological Services Field Office
1250 South Grove Avenue, Suite 103
Barrington, Illinois 60010

Dear Mr. Rogner:

Pursuant to Section 7 of the Endangered Species Act (ESA), (87 Stat. 884, as amended; 16 U.S. C. 1531 et seq.), the United States Environmental Protection Agency (USEPA) has reviewed the biological information and analysis related to a Prevention of Significant Deterioration (PSD) permit for ExxonMobil Oil Corporation – Joliet Refinery (ExxonMobil) to determine what impact there may be to any threatened or endangered species in the area around the proposed facility. The purpose of this letter is to seek concurrence from the United States Fish and Wildlife Service (USFWS) on our determination that the proposed project is not likely to adversely affect any federally listed species in relation to the proposed air quality permit for this facility.

The parties utilized the informal consultation process as specified in the "Endangered Species Consultation Handbook, procedures for conducting consultation and conference activities under Section 7 of the Endangered Species Act, (March 1998 final)," by the USFWS and National Marine Fisheries Service. The USEPA prepared this biological assessment following the guidance provided in the ESA consultation handbook, as well as the recommended content suggested in the ESA regulations found in 50 CFR Part 402.12(f). Additionally, USFWS provided USEPA a July 7, 2005 document titled, "Recommended Scope of Analysis for ExxonMobil Refinery Modification for Endangered Species Evaluation," describing the general topics of need, species of concern, effects analysis, and literature search, needed in the biological assessment. This document was revised on July 21, 2005. As part of developing the biological assessment, ExxonMobil prepared the August 3, 2005 document "Endangered Species Impacts Assessment ExxonMobil Oil Corporation – Joliet Refinery Unit Reliability – Efficiency Improvement Projects." ExxonMobil also provided supplemental information documents on September 1, September 12, and September 20, 2005.

Project Description

ExxonMobil is located on a 1,300-acre tract of land in unincorporated Will County, Illinois. The facility is a fully-integrated petroleum refinery which began operations in 1972. Will County is designated as an attainment area with all National Ambient Air Quality Standards except for ozone and particulate matter less than 2.5 micrometers in diameter. The area is designated as a moderate non-attainment area for ozone under the 8-hour standard.

The planned project will increase the efficiency and reliability of existing units at the refinery. The proposed modifications do not result in any new emission points or result in increased capacity at the facility. The planned modifications will allow for an increase in the annual fuels production at the refinery by improving efficiency of equipment, reducing planned downtime of equipment, and alleviating seasonal constraints that can be encountered during ambient temperature extremes. The design rates of the existing equipment will not change; therefore, the maximum hourly and daily emission rates will remain at or below the historically demonstrated maximum hourly and daily emission rates. All existing permit limits will remain in effect. Because the modifications will not result in an increase in short term emission levels, only the chronic impacts of the project were evaluated.

The project will increase annual emission rates of carbon monoxide (CO), nitrogen oxides (NOx), sulfur dioxide (SO_2), particulate matter/particulate matter less than 10 micrometers in diameter (PM/PM_{10}), volatile organic compounds (VOC), and several hazardous air pollutants (HAPs). The project emissions were calculated using the traditional applicability approach under the PSD program which compares past actual emissions to the potential to emit assuming operation at maximum capacity 8760 hours per year. The maximum potential increase in criteria pollutant emissions resulting from the planned project are as follows:

CO	233.99 tons per year
NOx	796.61 tons per year
SO_2	2519.53 tons per year
PM/PM_{10}	109.05/105.68 tons per year
VOC	5.42 tons per year

The project will potentially increase emissions of 36 HAPs with the most significant increases occurring in carbonyl sulfide, hydrogen chloride, nickel, phosphorus, toluene and xylene.

Action Area

The ExxonMobil facility is located near the Indeck Elwood Energy Center (Indeck). USEPA and USFWS concluded the ESA consultation process for Indeck in June of 2005. Because the ExxonMobil facility is very close geographically to the Indeck site and because the stack heights are much shorter than those in the Indeck evaluation, the

boundary of the assessment area for ExxonMobil was defined as the geographic area where the listed species and their respective habitats were already identified by the Indeck assessment.

List of Species

As specified in the USFWS recommended scope of analysis, the impacts of the project on the following species were addressed:

Leafy Prairie Clover (Dalea foliosa) -- The Leafy Prairie Clover is an endangered species which occurs on refinery property and at the nearby Midewin National Tallgrass Prairie. Other populations exist to the north along the Des Plaines River Valley.

Eastern Prairie Fringed Orchid (Platanthera leucophaea) -- The Eastern Prairie Fringed Orchid is an endangered species which occurs on land owned by the Illinois Department of Natural Resources at Grant Creek.

Lakeside Daisy (Hymenoxys herbacea) -- The Lakeside Daisy is a threatened species. An introduced population occurs at Lockport Prairie.

Hine's Emerald Dragonfly (Somatochlora hineana) -- The Hine's emerald dragonfly is an endangered species. Several populations occur along the Des Plaines River Valley.

Summary of Analysis

On June 15, 2005, representatives for USEPA, USFWS, the Illinois Environmental Protection Agency (IEPA), and ExxonMobil met to discuss the consultation process under ESA and the planned project at ExxonMobil. At this meeting, the parties chose to initiate the informal consultation process, and USFWS agreed to provide a document outlining the scope of analysis necessary. The USFWS provided this information in the July 7, 2005, document, "Recommended Scope of Analysis for ExxonMobil Refinery Modification for Endangered Species Evaluation." This document was later revised on July 21, 2005, to reflect comments received. To assist USEPA with its evaluation, ExxonMobil provided an August 3, 2005, report titled, "Endangered Species Impacts Assessment ExxonMobil Oil Corporation – Joliet Refinery Unit Reliability – Efficiency Improvement Projects." ExxonMobil provided three additional supplemental reports on September 1, 12, and 20, 2005. These documents provided the necessary information for USEPA's analysis.

The scoping document provided by USFWS indicated that the modeling for this analysis should follow the general guidance provided in Chapter 3 of USEPA's SLERA protocol for assessing chemical fate and transport, the modeling should show air concentrations and deposition rates for appropriate pollutants, and that the total impacts should be evaluated looking at the combined effects of the vapor phase, particle phase and particle-bound phase of pollutants. The document also indicated that ISCST3 was an acceptable

model for the analysis. Due to the proximity of ExxonMobil to Indeck, USFWS agreed that the same background information used for Indeck was appropriate for ExxonMobil.

Air Dispersion and Deposition Modeling

Criteria Pollutants

ExxonMobil performed air dispersion modeling using ISCST3 for CO, NOx, SO_2, and PM_{10}. ExxonMobil modeled a worst-case scenario using the maximum permitted emission rates and continuous operation at maximum capacity. Deposition modeling using ISCST3 was performed for nitrogen, PM_{10}, and sulfur.

As a comparison, ExxonMobil also performed modeling for nitrogen deposition using CALPUFF. After discussion with USFWS on September, 23, 2005, USEPA has chosen to evaluate the project using the ISCST3 results. ISCST3 is the model that would be used for the required ambient concentration modeling under the PSD program for this facility, as it is located in a Class II area. CALPUFF is generally recommended for long range transport (> 50 km) and complex wind situations. The PSD regulations do not require deposition modeling, thus, there is no USEPA recommended model for deposition under the program. Both models are capable of evaluating deposition. The approach to nitrogen chemistry in the ISCST3 model is more conservative, and is likely to produce worst-case results. Therefore, USEPA has chosen to use the more conservative ISCST3 nitrogen deposition results in evaluating the effects of the proposed project.

HAPs

In the September 1, 2005, supplement, ExxonMobil provided modeled HAP concentrations for 30 of the HAPs which will potentially increase as a result of the project. The modeled concentrations were compared to the minimum detection limits for each pollutant provided in two USEPA documents, the July 2004 "National Monitoring Strategy – Air Toxics Component, Final Draft," and EPA Document 454/R-01-007 "USEPA Quality Assurance Guidance Document." For the few instances where a detection limit was not reported, the detection limit for a similar compound was used. All 30 HAPs were below the minimum detection limit established in USEPA guidance. The highest concentration relative to detection limits was for zinc, which was modeled at 0.3% of the detection limit. No further analysis was performed for these pollutants.

The results of modeling performed for the remaining six HAPs (carbonyl sulfide, hydrogen chloride, toluene, xylene, nickel, and phosphorus) were provided in ExxonMobil's August 3, 2005, report. ExxonMobil used ISCST3 to perform dispersion modeling for carbonyl sulfide, hydrogen chloride, toluene and xylene. For purposes of evaluating the accumulation of metal HAPs in near-surface soil, the soil mixing model discussed in section 3.2.3 of ExxonMobil's August 3, 2005, report was used.

Background Levels

As indicated in the USFWS scoping document, the same background information used in the Indeck assessment was used for the ExxonMobil assessment. The monitor locations used were Cicero, IL for CO; Braidwood, IL for NOx; Joliet, IL for PM_{10} and SO_2; Schiller Park and Northbrook, IL for HAPs; and Bondville, IL for nitrogen and sulfur deposition.

Acid Fog

USFWS provided an analysis of acid fog via e-mail on September 28, 2005. The conclusion reached by USFWS was that the occurrence of an injurious acid fog event was unlikely given the meteorological and geographical conditions that exist in the action area.

Ozone

USEPA provided an analysis of the potential impact on ozone levels to USFWS via e-mail on September 8, 2005. Due to the small increases in VOC emissions resulting from the project and the lack of a reliable means to model ozone changes from such an increase, USEPA has concluded that the project will have no measurable effect on the threatened and endangered species with respect to ozone.

ESA Effects Analysis

In conducting the biological evaluation for the proposed project, toxicity benchmarks for the pollutants of concern were taken from sources commonly accepted and used by USEPA and other regulatory authorities. Where such established benchmarks were not available, Cambridge Environmental searched relevant literature to identify toxicological data which could appropriately be used to derive screening-level benchmarks for the T&E species at the site considered by this effects analysis. In a teleconference between USEPA and USFWS on September 15, 2005, USFWS indicated that they intended to adjust selected benchmarks to include a level of conservativeness and re-evaluate the project impacts. We have not received this supplement information from USFWS; therefore, the following analysis is based on the benchmarks identified in the original literature search.

Hine's Emerald Dragonfly

The chronic effects analysis for the Hine's emerald dragonfly focuses on the aquatic larval stage, where the dragonfly spends 96% to 99% of its life. No direct chronic effect from airborne pollutants is expected. Based on USEPA's SLERA protocol and additional information provided through toxicological profiles published by the United States Department of Health and Human Services, the pollutants most likely to effect the Hine's emerald dragonfly are nitrogen, hydrogen chloride, nickel, and phosphorus.

In section 3.2.3 of its August 3, 2005, report, ExxonMobil provides a description of an aquatic model developed by its consultant Cambridge Environmental. The model predicts steady-state concentrations of pollutants in surface water that are compared directly to benchmark concentrations. The model likely overpredicts actual concentration in surface water for many pollutants because it assumes that all pollutants deposited remain within the water column.

Cambridge Environmental on behalf of ExxonMobil conducted the literature survey for the identification of relevant environmental benchmarks. Their report is contained in Attachment C of ExxonMobil's August 3, 2005, report. The benchmarks selected were 40,000 µg/l for nitrogen, 230 µg/l for hydrogen chloride, 25 µg/l for nickel, and 5 µg/l for phosphorus. Pollutant concentrations were modeled at eight locations, with the highest concentrations occurring at the Lockport Prairie sites. The modeled concentrations for these sites are 13 µg/l for nitrogen, 0.76 µg/l for hydrogen chloride, 0.11 µg/l for nickel, and 0.17 µg/l for phosphorus. The worst-case modeled impacts on surface water concentrations of all pollutants of concern were insignificant in comparison to the benchmarks.

The Hine's emerald dragonfly larvae principally reside in sediments; therefore, potential increases in pollutant concentrations in sediments are more directly relevant than increases in surface water concentrations to adverse effects on the dragonfly. ExxonMobil provides additional information concerning the sediment impacts for the Hine's emerald dragonfly in its September 1, 2005, supplemental report. Attachment A of this report provides an analysis performed by Cambridge Environmental. Nickel is the only chemical likely to deposit to watersheds and accumulate in sediments; however, depending on its chemical speciation, it is possible phosphorus could deposit. A screening level of 22.7 mg/kg was selected for nickel based on USEPA ecological screening levels for the Resource Conservation and Recovery Act program (www.epa.gov/reg5rcra/ca/ESL.pdf). For phosphorus, a value of 600mg/kg, established by Ontario as a Low Sediment Screening Benchmark, was selected. The refinery would have to operate over 21,000 years to reach the nickel sediment screening criterion and more than 390,000 years to reach the screening criterion for phosphorus.

Based on the best available information, USEPA it is not likely that we would be able to detect or measure any negative response to this exposure as a result of project emissions. Therefore, we conclude that the proposed project at ExxonMobil is not likely to adversely affect the Hine's emerald dragonfly.

Leafy Prairie Clover, Eastern Prairie Fringed Orchid, and Lakeside Daisy

The pollutants of concern for these species include CO, NOx, SO_2, PM_{10}, carbonyl sulfide, hydrogen chloride, nickel, phosphorus, toluene and xylene. All ten pollutants were evaluated with respect to direct phytotoxicity through an analysis of modeled impacts to ambient air concentrations at each receptor location. Deposition to soil was also considered for nitrogen, sulfur, PM_{10}, chloride, nickel, and phosphorus. Cambridge

Environmental conducted a literature survey for the identification of appropriate environmental benchmarks for each pollutant.

Currently achievable method detection limits (MDLs) for ambient air monitors were compiled from IEPA and USEPA sources for six pollutants. MDLs were not available for carbonyl sulfide, hydrogen chloride and phosphorus, and modeling for SO_2 was not included in the August 3, 2005, report. For the six pollutants for which an MDL was identified, the highest ambient concentration at the receptor locations was below the MDL. Thus, ambient air monitoring systems are not capable of measuring any effect of the project on ambient concentrations of these pollutants at any of the receptor locations. For all nine pollutants the highest modeled concentration was compared to the background value for each pollutant. The highest modeled concentration from any receptor location is less than 1.1% of background and are within the year to year variability of background. Therefore, we conclude that because the project impacts on ambient concentrations of CO, NOx, PM_{10}, nickel, toluene, and xylene are immeasurable or indistinguishable from current background levels, these pollutants are not likely to adversely affect the species with respect to direct phytotoxicity. The results of modeling performed by ExxonMobil for SO_2 are included in its September 12, 2005, supplementary information report. In evaluating SO_2 ambient impacts, a toxicity value of $19\mu g/m^3$ identified in the Indeck biological evaluation was used. At all receptor locations the modeled impacts from the proposed project and Indeck were added to the background concentration. The combined concentrations were less than the toxicity value for SO_2 at all receptor locations; therefore, we conclude that increases in SO_2 are not likely to cause an adverse affect on the species with respect to direct phytotoxicity.

Additional analysis was conducted with respect to indirect phytotoxicity through deposition of air pollutants to soil. Chemicals for which appreciable soil deposition occurs are either accumulative or non-accumulative in nature. Of the ten pollutants evaluated for ExxonMobil, nickel is the only pollutant for which chemical-specific fate and transport indicates accumulation in soil. For the analysis, a soil mixing model described in section 3.2.3 of the August 3, 2005, report was used. The results of this model indicate that observed effects from nickel at a level of 44 mg/kg would occur after 45 thousand to 365 thousand years of operation.

Deposition modeling was performed to evaluate the non-accumulative soil deposition for nitrogen (from NOx), chloride (from hydrogen chloride), sulfur (from SO_2), and phosphorus (from diphosphorus pentoxide). Modeling results for sulfur were provided in the September 12, 2005, supplemental report, and the results for all other pollutants were provided in the August 3, 2005, report. Additional information with respect to nitrogen deposition was provided in ExxonMobil's September 20, 2005, supplemental information report. For chloride and phosphorus, the highest modeled deposition rates would result in less than a 1% increase over background deposition rates.

The deposition modeling for sulfur does show some large increases in deposition rate for 3 receptor locations over the background and Indeck deposition rates; however, these values represent worst-case values. Due to its limitations, the ISCST3 model

overpredicts deposition rates in the near field, contributing to the high values modeled at these sites. In addition, project increases were calculated assuming operation at maximum capacity, 8760 hours per year which would not actually occur. Finally, ExxonMobil has recently undertaken emission reduction projects at the facility. These emission reductions of 2593 tons per year of SO_2 were achieved in December of 2004 and are not included in the background deposition rates. When these reductions are considered, the Indeck and ExxonMobil projects result in a 9.8% increase over the monitored background rates at the highest location with ExxonMobil contributing 1.6%. No relevant sulfur deposition toxicity information was identified in the literature search conducted by Cambridge Environmental. In light of the lack of specific toxicity information and the conservativeness of the modeled scenario, there is no basis to conclude that the project increases in sulfur will result in an adverse impact on these species.

Nitrogen deposition was the area of greatest concern for these threatened and endangered species. Based on the literature survey conducted by Cambridge Environmental and on additional information provided by USFWS in a September 14, 2005, e-mail, USEPA was unable to identify a specific benchmark. However, it is likely that the appropriate benchmark for these species in this area is somewhere between 0.5 and 1.0 $g/m^2/yr$. The nitrogen background deposition rate from the representative monitoring location is 0.71 $g/m^2/yr$, thus, the background deposition rate may already be a concern for these species. Using the ISCST3 model, the worst-case impact from the proposed project would result in a deposition rate of 0.0828 $g/m^2/yr$ at the highest receptor location. As previously discussed, ISCST3 is a conservative model, likely overpredicting the project impacts. Additional impacts to consider include the actual anticipated operation of ExxonMobil, the emission offsetting required by the New Source Review program, and additional regulatory requirements that will decrease the background in the area. The 796.6 ton per year increase in NOx emissions modeled assumes operation at maximum capacity, 8760 hours per year. In Attachment A of the August 3, 2005, report, ExxonMobil provided information concerning the anticipated future actual emissions from the project based on a more likely operating scenario. This operating scenario would only result in an increase of 474.3 tons per year of NOx, approximately 40% lower than the worst-case scenario. Additionally, under the New Source Review program, ExxonMobil will be required to obtain emission offsets for NOx before operation of the proposed project commences. The location of these offsets is not known at this time; however, they must be generated from within the Chicago-Gary-Lake County, IL-IN ozone non-attainment area and would have some impact, although not necessarily an equivalent reducing impact, on the nitrogen deposition rates at the receptor locations. An article in the Air and Waste Management Association journal "EM" from July 2005, indicates that the National Park Service (NPS) has recognized the validity of the use of emission offsets to mitigate adverse impacts from sulfur deposition in Class I areas. The NPS credited offsets at a ratio of 1:4 to 1:1 depending on the location of the offset. The area considered by the NPS is larger than the Chicago-Gary-Lake County, IL-IN non-attainment area, suggesting that the offsets that will be obtained by ExxonMobil could be credited at a ratio of at least 1:4. ExxonMobil is required to obtain 752.9 tons per year of offsetting reductions. Finally, on March 10, 2005, USEPA finalized the Clean Air

Interstate Rule (CAIR) which calls for NOx and SO_2 reductions from 2003 baseline levels for the eastern United States. CAIR will require a 70,018 ton reduction in NOx emissions in Illinois from the baseline of 146,248 tons by 2009. The statewide NOx budget in 2015 will be 63,525. While these levels are for the entire State of Illinois, we would still expect a substantial reduction in background at the receptor locations. Based on these factors, we conclude that the increases in nitrogen deposition from the proposed project will not likely adversely affect the threatened and endangered species.

Finally, PM_{10} deposition on plant leaves was considered. Through a literature survey conducted by Cambridge Environmental, a benchmark of 10 $g/m^2/yr$ was selected. The highest modeled deposition rate for PM_{10} was 0.15 $g/m^2/yr$. USEPA concludes that PM_{10} deposition is not likely to adversely affect the threatened and endangered species.

ESA Determination

After review of the likely effects of the proposed project, it would appear that the only potential issue of concern is nitrogen deposition. This is greatly due to the high level of the background deposition rate. However, after consideration of the expected reduction in background levels which will occur as a result of CAIR, the conservative model used to predict project impacts, the emission offset requirements of the New Source Review program, and the likely operation of the refinery, USEPA believes that the likely impact from nitrogen deposition is considerably less than predicted.

Considering this analysis in its entirety, USEPA concludes that the proposed construction and operation of this facility may affect, but is not likely to adversely affect, any of the threatened and endangered species. USEPA respectfully requests USFWS concurrence on this determination.

Sincerely yours,

/S/

Pamela Blakley, Chief
Air Permits Section

cc: Jennifer Szymanski
United States Fish and Wildlife Service

Laurel Kroack
Illinois Environmental Protection Agency